IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Hanyu	§	Atty. Dkt. No.: COS-766DIV
Serial No.: 10/602,197	§	Group Art Unit: 1732
Confirmation No.: 2213	§	
Filed: June 24, 2003	§	Examiner: Eashoo
For: Heat-Sealable Films	§	Cust. No.: 25264

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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3/9/06
Date Signature

Dear Honorable Commissioner:

TRANSMITTAL LETTER AND FEE AUTHORIZATION

In connection with the above identified application, Applicants respectfully submit the following documents:

1. Appeal Brief.

The Commissioner is authorized to charge the fee of $500.00, along with any additional fees that may be required for this submission, or credit any overpayments, to Deposit Account No. 03-3345.

Respectfully submitted,

Lenora Evans

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03-13-06

AF/ Ifw

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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APPEAL BRIEF

Appellants submit this Appeal Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 1732 dated November 16, 2005, finally rejecting claims 21-26.

Real Party in Interest

The present application has been assigned to Fina Technology Inc., P.O. Box 674412, Houston, Texas 77267.

Related Appeals and Interferences

Appellants assert that no other appeals, interferences or judicial proceedings are known to the Appellants, the Appellants' legal representative or Assignee that will

directly affect, be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 21-26 are pending in the application and were originally presented in the application. Claims 21-26 stand rejected under 35 U.S.C. §103(a). The rejection of the pending claims is appealed. The pending claims are shown in the attached Appendix A.

Status of Amendments

No amendments were made to the pending claims in response to the Final Office Action.

Summary of Claimed Subject Matter

Embodiments of the invention generally include biaxially-oriented films having enhanced heat seal and hot tack characteristics. *See,* specification, at least page 11, lines 4-10. The film includes a substrate layer formed of a crystalline thermoplastic polymer. *See*, *Id.* at least page 12, lines 14-18. The film further includes a heat-seal layer (*e.g.*, surface layer) formed of a syndiotactic propylene polymer. *See, Id.* at least page 12, lines 20-24 and page 16, lines 21-22. The syndiotactic propylene polymer is characterized by a melt flow index that is less than 2 g/10 minutes. *See, Id.* at page 17, lines 15-20. Further, the heat seal layer has a thickness that is substantially less than the thickness of the substrate layer. *See*, *Id.* at least page 17, lines 22-23. Further, the film has a seal initiation temperature less than 110°C. *See, Id.* at least page 22, lines 16-20.

Grounds of Rejection to be Reviewed on Appeal

1. The rejection of claims 21-26 under 35 U.S.C. §103(a) as being unpatentable over *Bothe* in view of *Peete*.

Arguments

I. THE EXAMINER ERRED IN REJECTING CLAIMS 21-26 UNDER 35 U.S.C. §103(a) AS BEING UNPATENTABLE OVER *BOTHE* IN VIEW OF *PEET* BECAUSE A PRIMA FACIE CASE OF OBVIOUSNESS HAS NOT BEEN PRESENTED.

The Examiner states that while *Bothe* does not teach a surface layer comprising syndiotactic polypropylene having a melt flow index of less than 2 grams/10 minutes, *Peet* teaches surface layers comprising such a melt flow index. *See*, Final Office Action at page 2, paragraph 6. Further, the Examiner states that *Bothe* and *Peet* are combinable because they are from the same field of endeavor, namely, multi-layer films and that at the time of invention a person of ordinary skill in the art would have found it obvious to use a surface layer comprising syndiotactic polypropylene having a melt flow index of less than 2 grams/10 minutes, as taught by *Peet*, in the process of *Bothe* because *Peet* suggests that such syndiotactic polypropylene is suitable for surface layers of multilayer films. *See, Id.*

It is well settled that the Examiner bears the initial burden of establishing a prima facie case of obviousness. *See*, *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984.) Appellants strongly disagree that the Examiner has established a prima facie case of obviousness. To establish a prima facie case, the PTO must satisfy three requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references. *See, Karsten Mfg. Corp. v. Cleveland Gulf Co.*, 242 F.3d 1376, 1385, 58 U.S.P.Q.2d 1286, 1293 (Fed. Cir. 2001.) Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *See, Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1209, 18 U.S.P.Q.2d 1016, 1023 (Fed. Cir. 1991.) The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification. *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984.)

Bothe teaches a multilayer polypropylene film characterized by good optical properties. *See*, at least column 1, lines 5-15 and column 6, lines 30-39. The multilayer polypropylene film includes a base layer formed of a polypropylene having a melting point of 140°C or greater, such as isotactic polypropylene. *See*, at least column 2, lines 25-35. The multilayer polypropylene film further includes a top layer formed of a polypropylene having a mean length of syndiotactic sequences that is greater than 20 and a high melt flow index (*e.g.*, 28 g/10 min.) *See,* at least column 2 at lines 65-70 and column 5, lines 45 and 57.

Peet teaches a biaxially oriented multilayer film structure having a substrate formed from high density polyethylene and at least one skin layer (*e.g.*, surface layer) formed from syndiotactic polypropylene to improve barrier properties. *See*, column 2, lines 39-44 and column 4, lines 41-45. The syndiotactic polypropylene has a melt flow index of from about 1.5 g/10 min. to about 5 g/10 min. *See*, column 4, lines 10-15.

If a proposal for modifying the prior art in an effort to attain the claimed invention causes the art to become inoperable or destroys its intended function, then the requisite motivation to make the modification would not have existed. *See, In re Fritch*, 972 F.2d 1260, 1265, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992,) *In re Ratti,* 270 F.2d 810, 813, 123 U.S.P.Q. 349, 352 (C.C.P.A. 1959) (holding the suggested combination of references improper because it "would require a substantial reconstruction and redesign of the elements shown in [a prior art reference] as well as a change in the basic principles under which [that reference's] construction was designed to operate.") While the Examiner asserts that it would be obvious to replace a high MFI polypropylene with a low MFI polypropylene simply because two references teach multilayer films, it is well known in the art that as the MFI of a polymer decreases, the optical properties, such as gloss, also deteriorate. *See*, Cabot Corp. Film: General Application Guide < http://www.cabot-corp.com/cws/businesses.nsf/CWSID/cwsBUS17122001093208265?OpenDocument&bc=Products+%26+Markets/Film/Application+Info&bcn=23/4294967115/3045&entry=market>. *Bothe* is aimed at increasing gloss and therefore there is no motiviation to modify the primary reference with a low MFI (low gloss) polymer as taught by *Peet.*

Accordingly, a prima facie case of obviousness has not been presented and the references of record do not teach, show or suggest producing a multilayer film having a

substrate layer comprising a first crystalline thermoplastic polymer and a surface layer comprising a polymer consisting essentially of a syndiotactic propylene polymer having a melt flow index of less than 2 g/10 minutes, as recited in pending claim 21. Therefore, reversal of the rejection is respectfully requested.

Conclusion

In conclusion, a prima facie case of obviousness has not been presented. Thus, Appellants respectfully request reversal of the rejections of claims 21-26.

Respectfully submitted,

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Appendix A

Pending Claims

21. In a process for the production of a multilayer film having a substrate layer and a surface layer, the process comprising:

(a) providing a first crystalline thermoplastic polymer;

(b) extruding the first crystalline thermoplastic polymer and forming the first crystalline thermoplastic polymer into a flexible substrate layer having an interface surface;

(c) providing a second polymer comprising a polymer consisting essentially of a syndiotactic propylene polymer having a melt flow index of less than 2 grams/10 minutes produced by the polymerization of propylene in the presence of a syndiospecific metallocene catalyst effective to form a surface layer, the surface layer capable of producing a heat seal with itself at a seal temperature less than 110°C;

(d) extruding the syndiotactic propylene polymer to form a surface layer; and

(e) bonding the surface layer to the interface surface of the substrate layer to form a multilayer film having a surface layer of syndiotactic propylene polymer which has a thickness that is less than the thickness of the substrate layer.

22. The process of claim 21 wherein the first polymer is an isotactic propylene polymer.

23. The method of claim 21 wherein the substrate layer film is formed by orienting the substrate layer form in at least one direction and thereafter forming the surface layer by extrusion-coating the syndiotactic polypropylene on to the oriented substrate layer film.

24. The process of said claim 21 wherein said multilayer film is formed by co-extruding the first and second polymers through a slotted die system to form a multilayer film comprising a substrate layer of the first polymer and a surface layer of the second polymer and thereafter orienting the film in the machine direction followed by orienting the film in the transverse direction to form a biaxially-oriented multilayer film.

25. In a process for the production of a multilayer film having a substrate layer and a surface layer, the process comprising:

(a) providing a first polymer to form the substrate layer of a multilayer film;

(b) providing a second polymer comprising a polymer consisting essentially of a syndiotactic propylene polymer having a melt flow index of less than 2 grams/10 minutes produced by the polymerization of propylene in the presence of a syndiospecific metallocene catalyst effective to form a heat-sealable surface layer of said multilayer film; and

(c) co-extruding said first and second polymers through a slotted die system at a temperature within the range of 150°-260°C to form a film comprising a substrate layer of said first polymer and a surface layer of said second polymer of a thickness which is less than the thickness of said substrate layer.

26. The process of claim 25 wherein the surface layer of said second polymer is effective in producing a heat seal with itself at a seal temperature of no more than 110°C.

Appendix B

Evidence

1. *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984.)

2. *Karsten Mfg. Corp. v. Cleveland Gulf Co.*, 242 F.3d 1376, 1385, 58 U.S.P.Q.2d 1286, 1293 (Fed. Cir. 2001.)

3. *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 1209, 18 U.S.P.Q.2d 1016, 1023 (Fed. Cir. 1991.)

4. *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984.)

5. *In re Fritch*, 972 F.2d 1260, 1265, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992,) *In re Ratti,* 270 F.2d 810, 813, 123 U.S.P.Q. 349, 352 (C.C.P.A. 1959.)

6. Cabot Corp. Film: General Application Guide < http://www.cabot-corp.com/cws/businesses.nsf/CWSID/cwsBUS17122001093208265?OpenDocument&bc=Products+%26+Markets/Film/Application+Info&bcn=23/4294967115/3045&entry=market>.

Appendix C

Related Proceedings

Not Applicable

Film: General Application Guide

Plastic film production consists of the mixing of natural thermoplastic carrier resins together with pigment or additive masterbatches that are converted into films on rolls.


Black Masterbatch

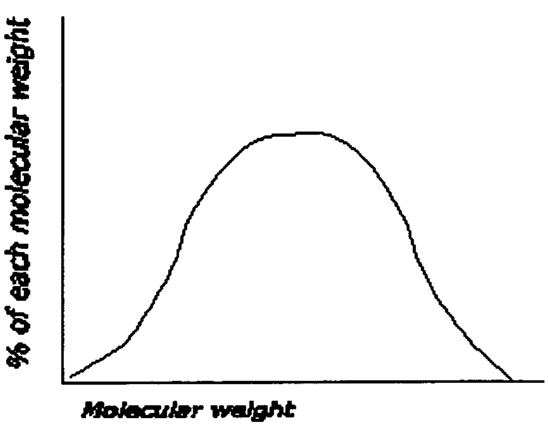

Black Film

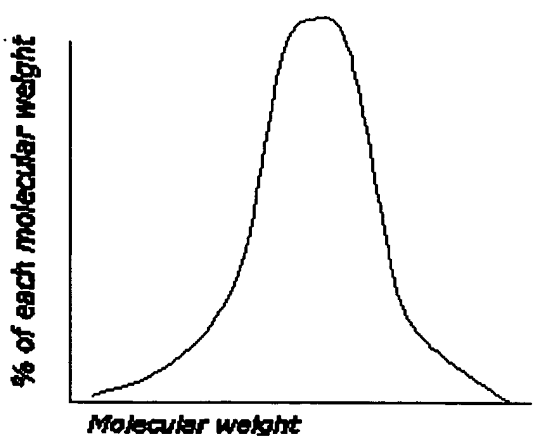
1. Polyolefins

Polyolefins are the most widely used materials for the manufacture of films. The film producer can choose from a large variety of polyolefins types to meet the end use requirements for price and performance. Those polyolefins have the following attributes:

- Density: density range, effect of density
- Melt Flow Index: effect of MFI
- Molecular weight distribution

Broad MWDxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx**Narrow MWD**

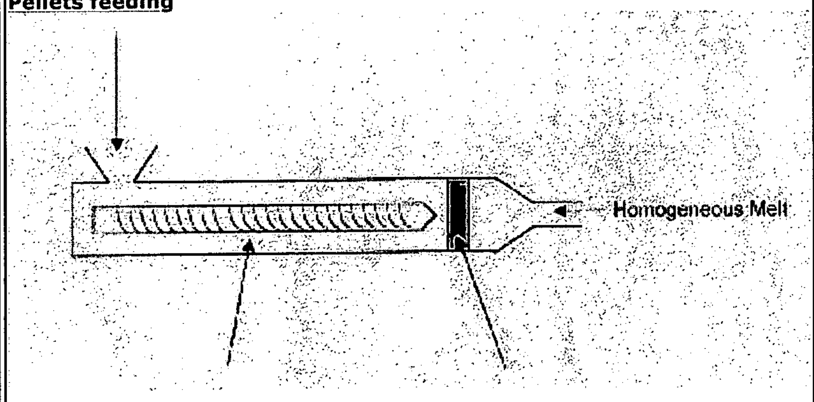




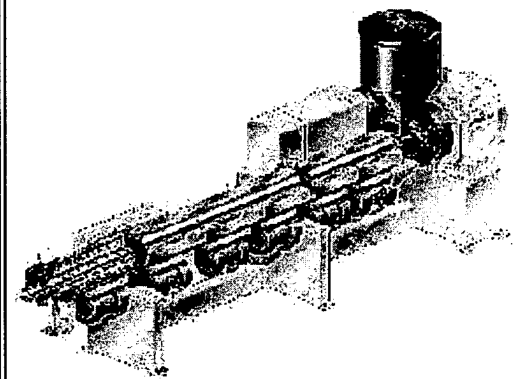
Polymers with Narrow Molecular Weight Distributions show a lower melt strength. They generally have greater stress cracking resistance and better optical properties. LDPE, LLDPE, their blends, and HDPE are used for the majority of applications.

2. Extrusion Process

The first phase of film production is the extrusion process. The extruder is commonly defined by the diameter and the length/diameter ratio (L/D) of the screw. Its design depends on the type of polymer being processed.



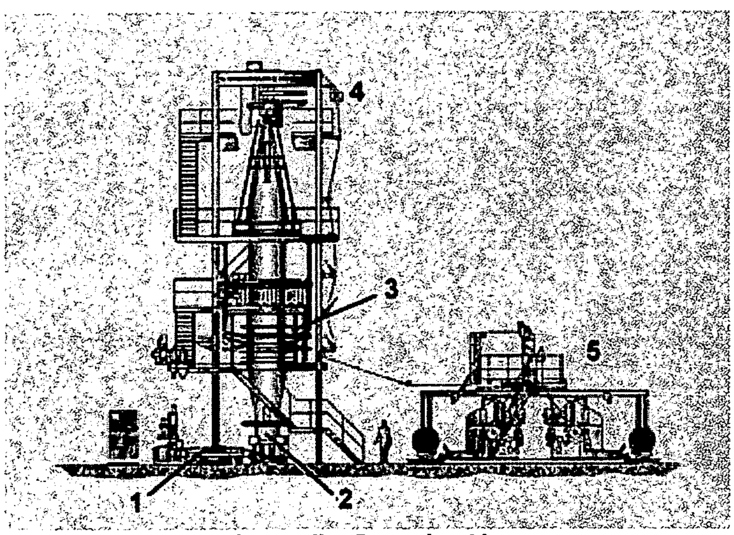
Melting, mixing, meteringxxxxxxxxx**Filtration**



Extruder
(Courtesy of Reifenhäuser)

3. Blown Film Extrusion

Film blowing is the most commonly used technique. About 90% of all polyethylene films are manufactured on blown film lines.



Blown Film Extrusion Line
(Courtesy of Windmöller & Hölscher)

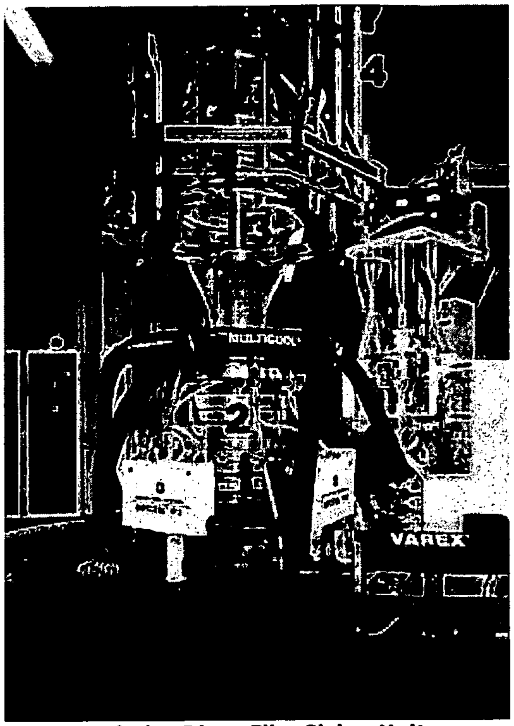
1. **Extruder**
2. **Tubular Die**
3. **Film Sizing Unit**
4. **Haul-Off Unit**
5. **Winder**

The polymer melt stream coming out of the extruder is shaped into a tubular blowing head (tubular die).

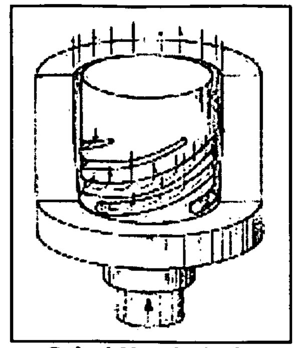
These numbers correspond to the numbers in the photo below:

1. **Extruder**
2. **Tubular Blowing Head**
3. **Bubble**
4. **Film Sizing Unit**

In the case of tubular die, the most favored construction for high output rate is currently the "Spiral Mandrel Die."



Tubular Die + Film Sizing Unit
(Courtesy of Windmöller & Hölscher)



Spiral Mandrel Die
(Courtesy of F. Hensen,
"Plastics Extrusion Technology",
2nd Edition, 1997, Hanser Verlag)

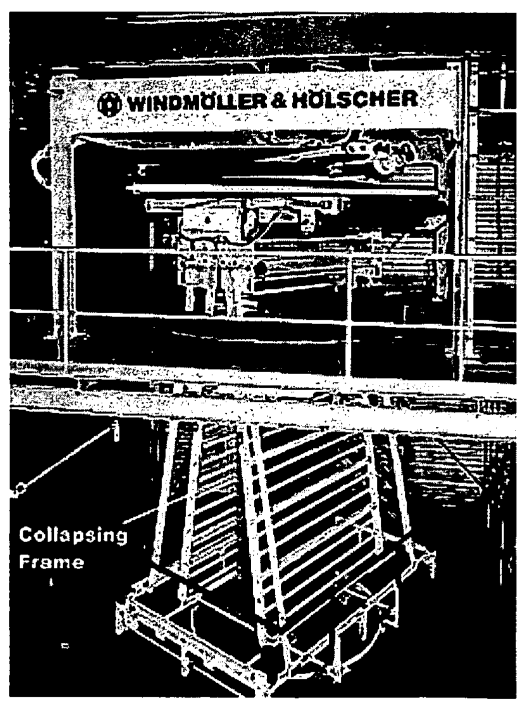
The melt enters the round die either through the bottom or the side, it is then forced through spiral grooves around the surface of a mandrel and exits the circular die opening in the form of a thick walled tube.

The tube, still in the molten state, is expanded into a long "bubble" of desired diameter. This "bubble" formation results from the volume of air introduced into the tube through the center of the die.

Bubble Cooling: Bubble cooling occurs when air emerges from the cooling ring (mounted directly on the die outlet), which cools down the external surface of the bubble. The volume, speed, temperature of air, as well as the direction of air stream, determine the rate of cooling. Superior cooling performance is achieved when internal cooling is also used: an air exchange system "inside" the bubble brings in fresh air and removes internal air (as well as volatiles) from inside the bubble. This Internal Bubble Cooling (IBC) system significantly increases the throughput of the blown film line.

Film Sizing System: The bubble is then calibrated in a Film Sizing System. The sizing system scans the bubble with a sensitive contact device. The internal pressure is held constant so that the dimension of the bubble remains uniform.

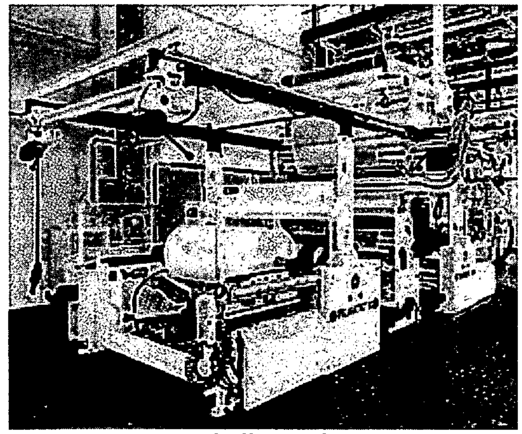
Haul-Off Unit: At its upper end, the bubble is gradually flattened by collapsing frames and then guided to a nip roll assembly. Some lines have oscillating haul-off units to minimize the thickness variability in the final roll of film. This offers an alternative to the use of rotating dies.



Haul-off Unit

(Courtesy of Windmöller & Hölscher)

Winding Unit: The film is then tightly wound on a cardboard tube (called a core).



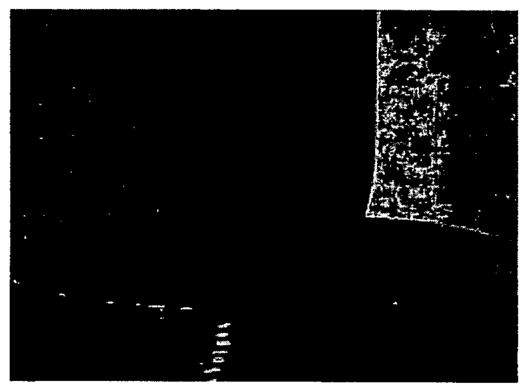
Winding Unit
(Courtesy of Windmöller & Hölscher)

The thickness of the film depends on three variables:

1. The extruder output: when extruder output increases ==> film thickness increases
2. The haul-off speed: when haul-off speed increases ==> film thickness decreases
3. The bubble size: when the bubble diameter increases, the film thickness decreases. A relationship between bubble size and die size has been defined as the Blow Up Ratio (BUR).

BUR = Bubble Size
xxxxxxx**Die Size**

The BUR is an important parameter for the following film properties.

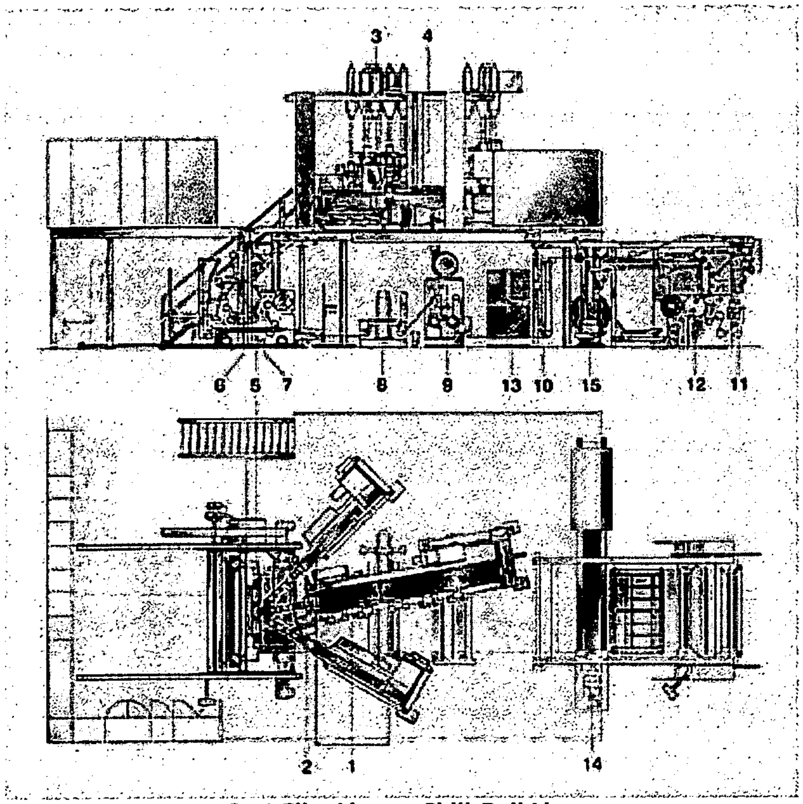


When BUR increases:

- impact strength increases
- optical properties increases
- tear resistance and tensile properties become more balanced in MD (Machine Direction) and TD (Transverse Direction)

4. Cast Film Extrusion

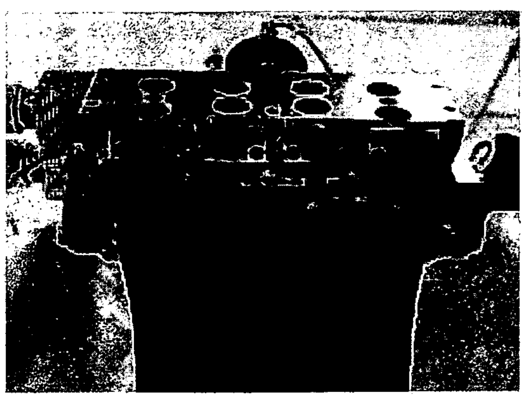
1. Extruder
2. Screen Changer
3. Vacuum Load Platforms
4. Gravimetric Dosing and Throughput Control System
5. Coextrusion Feedblock
6. Automatic Die
7. Modular Chill Roll Unit
8. Gauge Measurement System
9. Two-Sided Corona Treatment with (Extraction



10. Web Oscillation
11. Edge Trim Removal
12. Winding Unit
13. Operator Console
14. Roll Shaft Extractor and Refeeding System
15. Roll Transport Cart

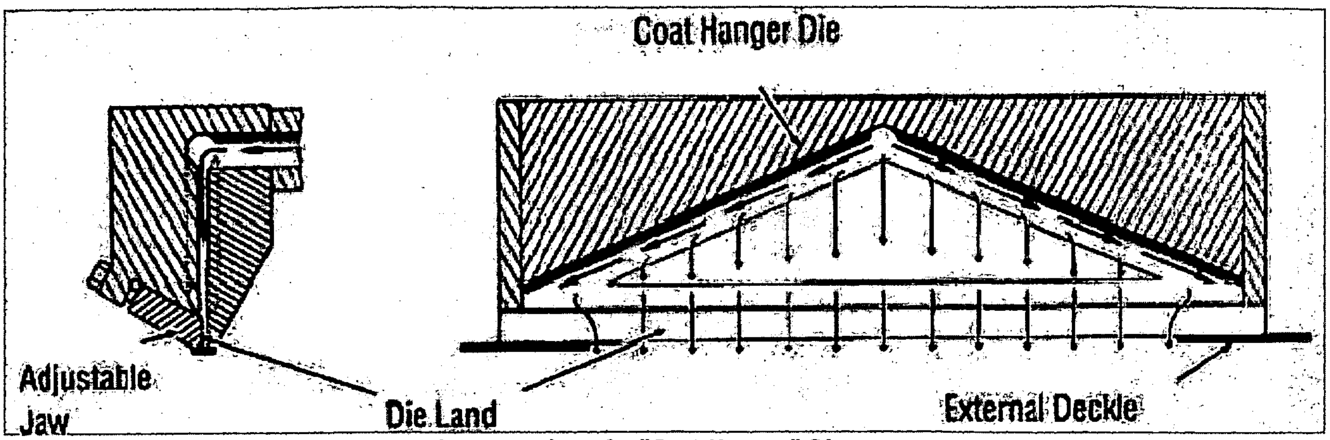
Cast Film Line or Chill-Roll Line
(Courtesy of Windmöller & Hölscher)

A flat die shapes the melt into a planar structure.



xxxxxxxxxxxxxxxFlat Die

The most common cast film die is the "Coat-Hanger" design. The melt is evenly distributed and exits the die through the opening be the die lips.



xxxxxxxxxxxxxxxxxxxxxddxxxxxxxxxCross section of a "Coat Hanger" Die
ccccccccccccccccccccccddcccccccccc(Courtesy of Equistar Chemicals)

The film is then solidified by cooling. Therefore, the molten web leaving the die makes contact with a water-cooled casting roll (chill-roll), where cooling takes place. Most of the cooling occurs on the casting roll; additional cooling rolls are used to further drop the temperature of the film. A winding unit puts the film on a roll.

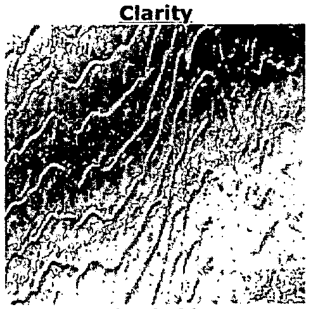
5. Comparison of Blown and Cast Film Processes

Each of the extrusion processes have advantages and disadvantages. The following tables describe the manufacturer's viewpoint:

+ Benefitvvvv - Drawback

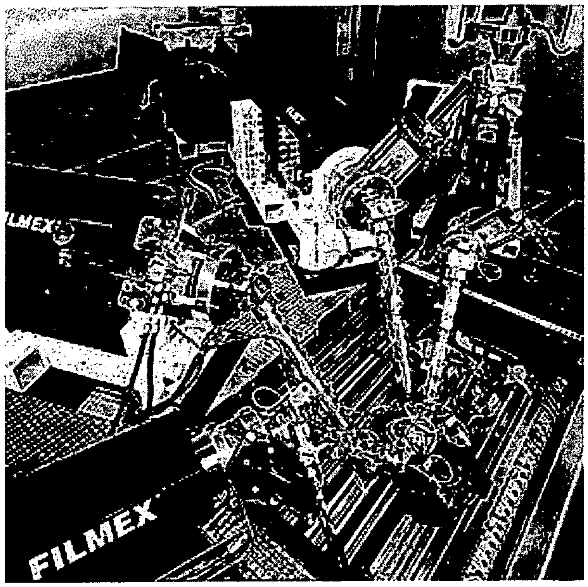
	CAST	BLOWN
Manning Levels	=	=
Power Requirements	=	=
Floor Space	-	+
Roof Height	+	-
Minimum Edge Trim	-	+
Flexibility on Width Change	-	+
Flexibility on Thickness Change	+	-
Operator Skills Required	+	-
Maintenance (Die Cleaning)	+	-

+ Benefitvvvv- Drawback

FILM PROPERTIES	CAST	BLOWN
Clarity  Sharkskin	+	-
Gloss	+	-
Stiffness	-	+
Barrier to Vapor or Gas	-	+
Thickness Uniformity	+	-

Maximum Width	- (3.5 m)	+ (18.5 m)
Orientation	-	+
Physical Properties	-	+

6. Coextrusion



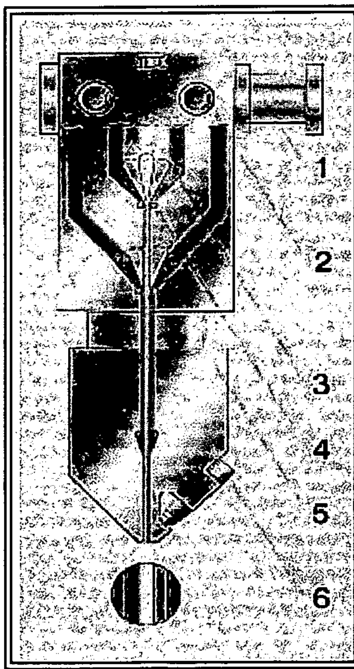
Coextrusion Line
(Courtesy of Windmöller & Hölscher)

Coextrusion is used in the production of multilayer films; it combines more than one layer with different materials and thicknesses. The main reason for coextrusion is to take advantage (in one film) of the desirable properties of the individual components or film layers.

Coextrusion is used to:

- **Improve film quality:** increased strength at smaller thickness than monolayer film, combination of polyolefins with barrier material such as polyamide (PA), polyethylene terephtalate (PET) and ethylene vinyl alcohol copolymer (EVOH).
- **Improve conversion behavior:** For example, to increase the speed of bag-making machines.
- **Reduce production costs:** by reducing film thickness, using cheaper polymers or recycled material which will be "encapsulated" in the film construction.

In the cast film coextrusion, the individual layers are generally combined in an adaptor or feedblock, and then distributed across the width of the flat die.



Selector Plug

Extruder Connection

Adjustable Van

Distributor Pin

Slot Die

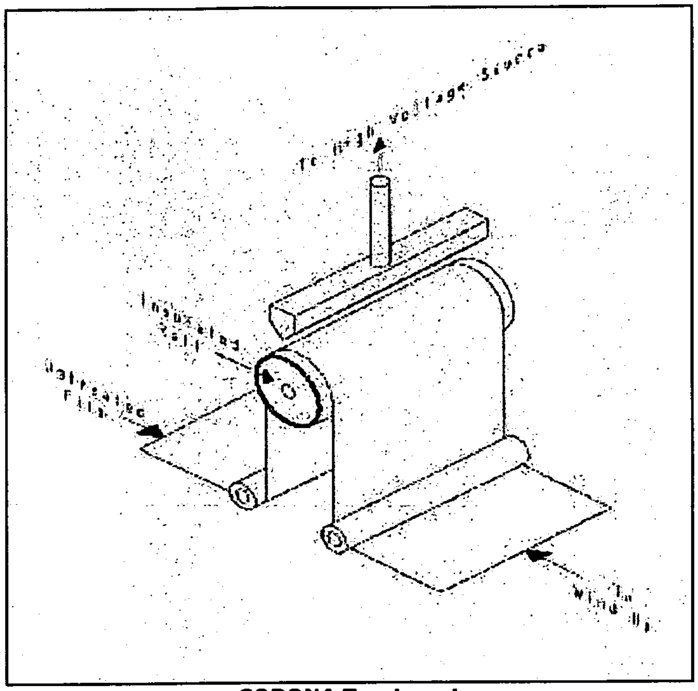
Expansion Bolt

Feedblock (Courtesy of Windmöller & Hölscher)

By contrast to cast film, blown film coextrusion operates with separate melt channels.

7. Printing

Polyolefins films possess relatively inert, low surface energy surfaces that show poor wetting and adhesion to printing inks. To allow printing, converters must apply surface treatment. The most commonly used is the **CORONA** treatment.



CORONA Treatment

CORONA treatment: As film moves between a high voltage electrode and an insulated roll, a uniform Corona discharge (consisting of a plasma of ionized gas and other reactive species) produces some oxidation of the film surface.

The level of treatment is characterized by the surface tension measurement of the film. The surface tension of a (non-treated) polyethylene film is about 30 dyne/cm. Adhesion of ink requires a surface tension >36 dyne/cm.

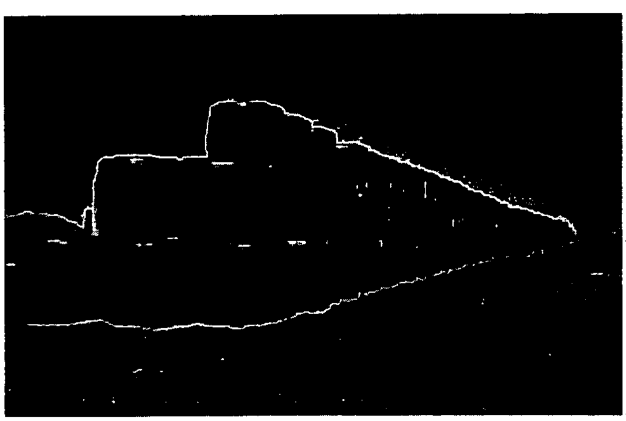
An excessive level of treatment (>50 dyne/cm) will cause some degradation of the polyethylene film.

8. Core Applications for Polyolefin Films

- Packaging films
- Bag films (carrier bags, heavy-duty sacks, refuse bags)
- Laminating films
- Stretch films
- Shrink films
- Hygiene films
- Surface protection films
- Agricultural films (mulch, silage, covering)

9. Black Films

Carbon black-based films do not only have a black color, they also exhibit high levels of opacity and resistance to weathering. For instance, black agricultural films, such as mulch films and silage films for bale wrapping, take advantage of the opacity and weathering performances offered by carbon black.



Black Silage Bale Wrap

Black Mulch Film

For agricultural film, a technical committee (CEN TC 249 / WG 7) works on the issue of a European Standard for Agricultural Films (silage, mulch and covering films), which establishes the quality requirements, specifications and test methods related to these films.

10. References

- "Plastics Extrusion Technology" - 2nd edition – F. Hensen, Hanser Publications
- "Plastics Films" – K.R. Osborn & W.A. Jenkins, Tecnomic Publishing
- "A Guide to Polyolefin Film Extrusion" – Equistar Chemicals
- "Blown Film Basic Level" - Revision 3 – Course manual by C.P. Smith, British Polymer Training Association
- **Windmöler & Hölscher website**

Melt Flow Index (MFI) Effects

As MFI increases:

- Downgaugability decreases
- Melt strength decreases
- Tensile strength at break decreases
- Tensile elongation decreases
- Impact strength decreases
- Tear strength decreases
- Haze decreases
- Gloss increases
- Clarity increases
- Heat seal temperature decreases
- Resistance to stress cracking increases.

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